

#### ABSTRACT OF THE DISCLOSURE

First channel waveguides 102<sub>1</sub> to 102<sub>3</sub> of an array waveguide grating are connected via a first to a third exponential function shape optical waveguide 111<sub>1</sub> to 111<sub>3</sub>,  
5 to a first sector-shape slab waveguide 105. In a second boundary part 109 which is disposed symmetrically with a first boundary part 108 via a channel waveguide array 104, second channel waveguides 103<sub>1</sub> to 103<sub>3</sub> are connected via a first to a third taper shape optical waveguide 112<sub>1</sub>,  
10 to 112<sub>3</sub> to a second sector-shape slab waveguide 106. By adopting exponential function shape optical waveguides 111 at least partly, the optical frequency characteristics can be improved compared to the case of the second degree function shape, and also the degree  
15 of freedom can also be improved compared to the case of the rectangular shape.